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(54) Method and means for securing preferably sheet-like material to an underlying layer

(57) In order to obtain a strong and tight glue joint between for example a body plate (1) and a repair piece (2) there is used a method where a pressure leg(s) (19) is placed on top of the joint and retained there pressed down for the curing time of the glue.

Suction discs (5) and an intermediate piece (15) may support the pressure leg (19) and a supporting leg (13) acting counter to the pressure leg.

All connecting pieces between the legs (13, 19) and the suction discs (15) are longitudinally adjustable and angular adjustment is also provided (Fig. 3).

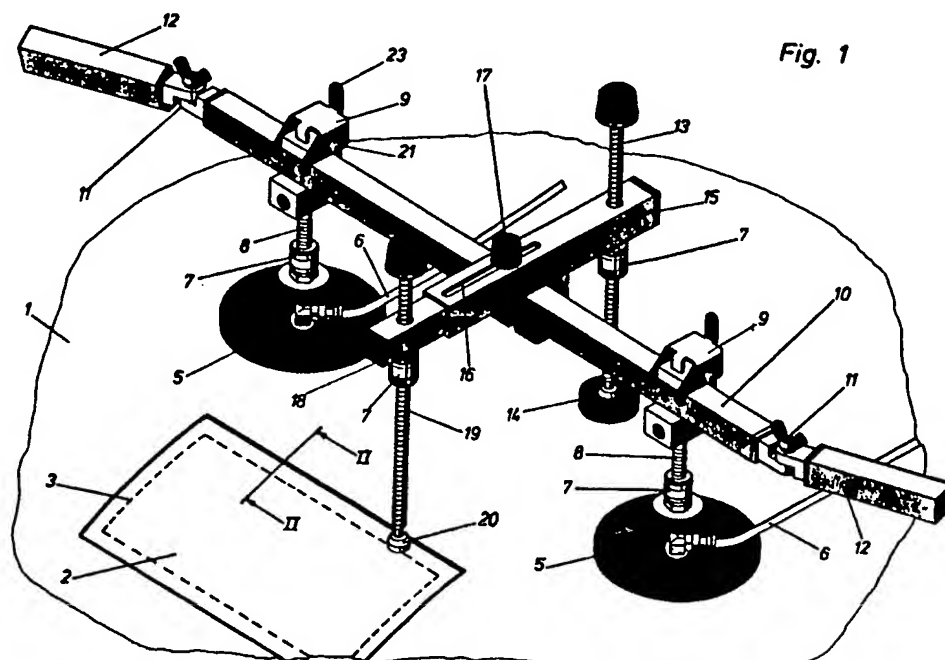
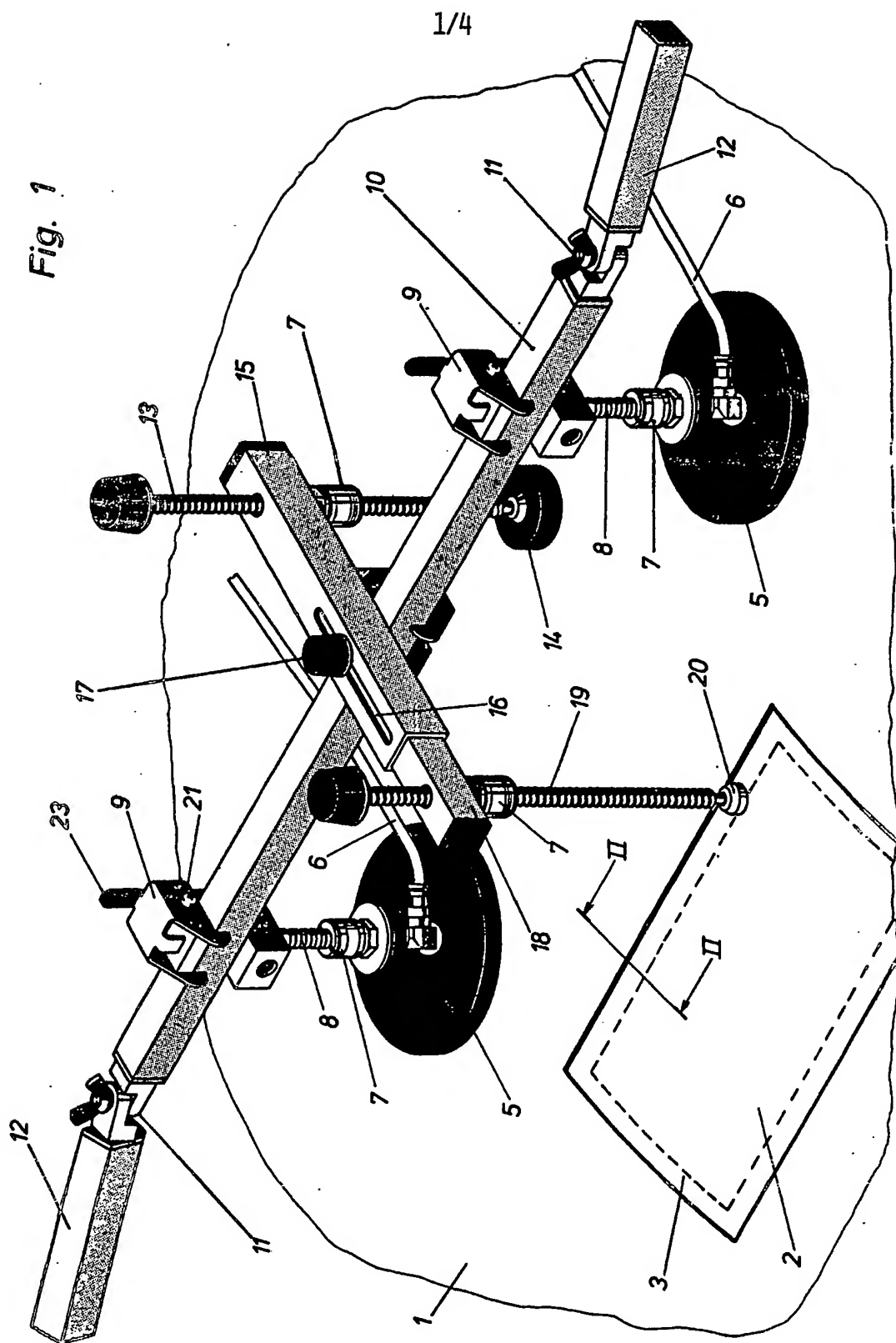


Fig. 1

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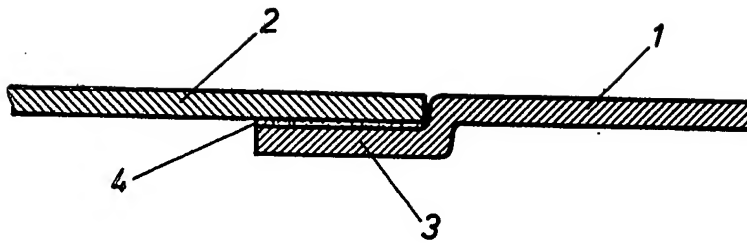
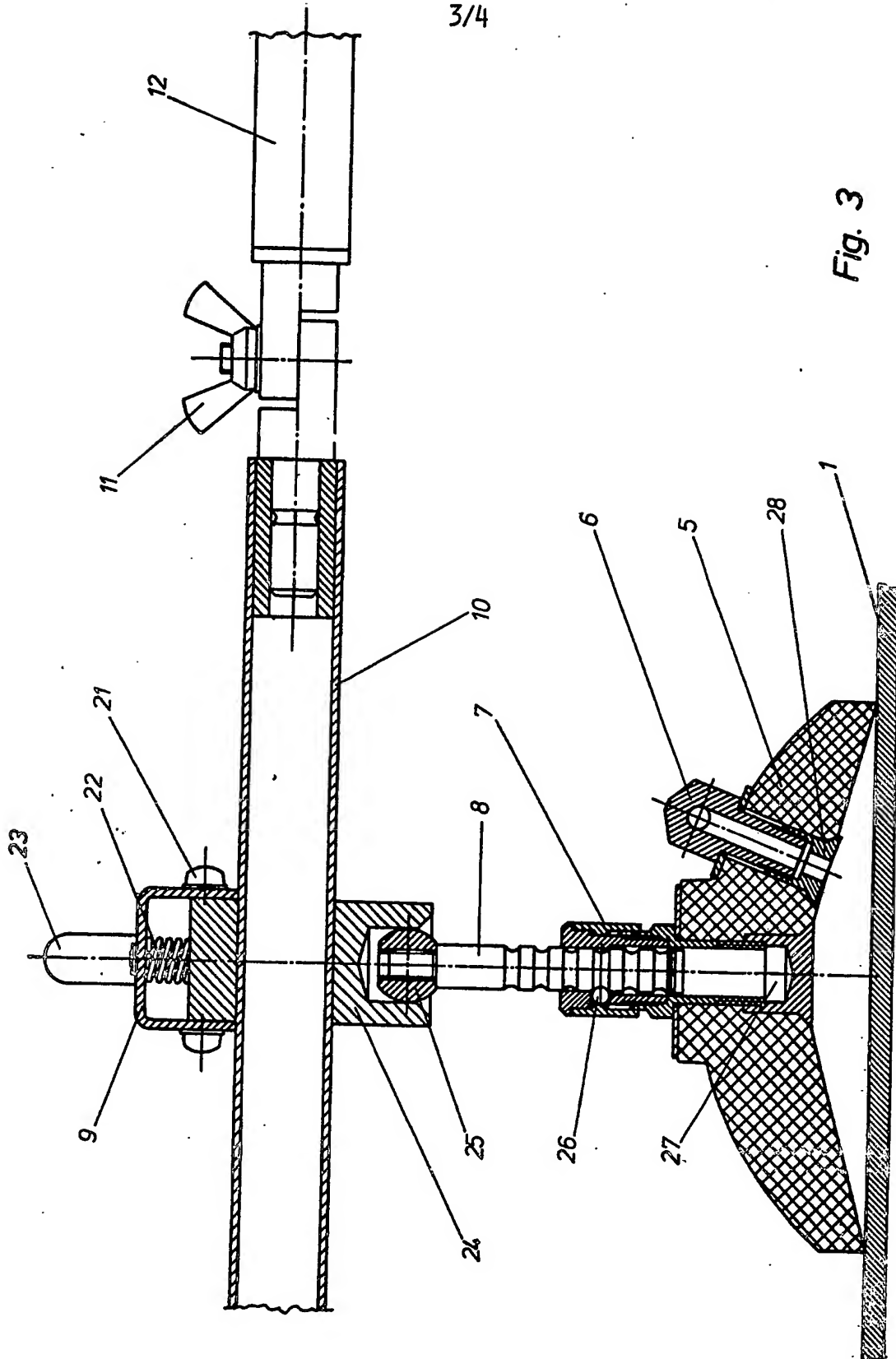


Fig. 2



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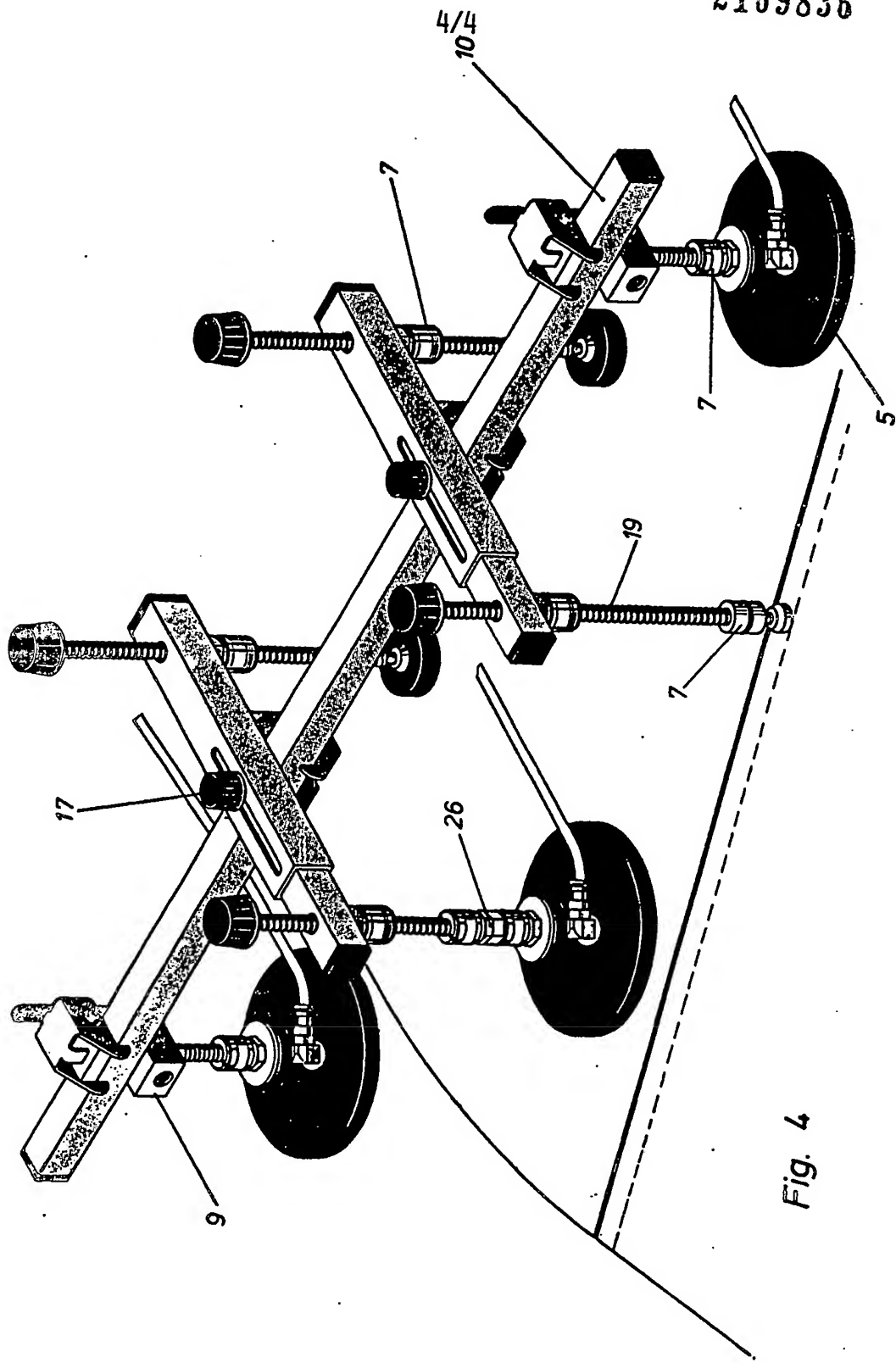


Fig. 4

SPECIFICATION

Method and means for securing preferably sheet-like material to an underlying layer

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The invention relates to a method for securing preferably sheet-like material to an underlying layer for example for the curing period of a glue joint between the material and the underlying layer and to a means for carrying out the method.

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When for example bodies are being repaired, there is used a method consisting in removing the damaged or corroded piece of plate either by cutting or by grinding. Then the plate edge surrounding the piece removed must be flanged in order that the new piece of plate, the repair plate, may rest on a sunk edge part whereby the outside of the plates flush.

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The flanging is carried out by known tools which may be pneumatic or manually operated.

Then the repair piece must be fit in size and shape which is done in a generally known manner. In cases where the repair piece is to be secured by spot welding it may in some cases be necessary to punch holes in the edge part.

Alternatively, the plates are welded together by generally known welding processes. After the welding the joint will normally have to be filled for example by tin filling or with some other suitable filling material.

This known method is in many ways encumbered with disadvantages and drawbacks. First and foremost the welding causes considerable thermal stresses in the plates which requires important finishing treatment. Moreover, the plate joint is open at the back which will admit moisture that may thus cause corrosion.

Finally, the method takes long time both during the preliminary work which includes removal of inflammable objects, repair work and subsequently by repairs of the surface before the final painting can be carried out.

To sum up it may be established that the repair work in connection with body damages is time-consuming and not always satisfactory especially in cases where the repair has been made in corroded plates where it is difficult to make a satisfactory weld.

To remedy these drawbacks it has been suggested to join the plates by glueing in that such glueing is in many respects superior to welding.

This is particularly the case in relation to the strength of the joint which may become much greater than by welding and at the same time become quite tight and resistant to chemical actions and mechanical stresses.

A glue joint is furthermore vibration dampening and being cold it is not necessary to remove inflammable materials such as linings,

wires and the like just as thermal distortions in the joint are avoided. Moreover, plates which are already corroded may more easily be joined by glueing and thus obtain greater strength.

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Finally, it is possible by glueing to join non-weldable materials with the same good results.

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For being able to make a glue joint, however, an effective holding together of the parts for the curing period of the glue is required since the joint will not obtain the required strength and tightness if the parts are not constantly held together for the curing period which by workshop temperatures may last more than 24 hours.

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It is the object of the invention to provide a method for retaining the parts during the curing of the glue and the method consists in placing a leg to contact the sheet-like object and in placing a second leg to contact the underlying layer, said legs being releasably secured to the underlying layer. By means of this method it is possible to use the glue joint for repair work in a safe manner in that one leg can be placed on top of the repair piece and the other leg on the surrounding body plate and retain the legs in such a manner that the required pressure is obtained. In this manner it is possible to place an object at any desired place and ensure that the pressing together becomes sufficient for ensuring the strength of the joint.

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By releasably securing the legs it is possible to mount and dismount the legs and thereby ensure the pressing together for any desired period.

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By using legs as disclosed in claim 2 that are longitudinally adjustable it is possible to use the method universally since the legs may be adjusted to the outer shape of the body.

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By using a suction disc as disclosed in claim 3 as a retaining means it is easy to mount and dismount the retaining tool by evacuating and equalizing, respectively, the inner air space of the suction disc.

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Finally, it is advantageous as disclosed in claim 4 to use releasable ball locks for adjusting the length of the legs in that the adjustment may take place easily and quickly without any use of tools.

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The invention will be further described in the following with reference to the drawing wherein

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Fig. 1 is a perspective view of an example of a mounted retaining tool,

Fig. 2 is a section of the glue joint seen in the direction II-II in Fig. 1,

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Fig. 3 is a cross-section of the suction disc and its mounting on the tool, and

Fig. 4 is an example of an arrangement comprising a leg for pressing down as well as a suction disc for lifting the underlying layer.

Fig. 1 shows an example of a tool for pressing down a repair piece 2 in a body

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plate 1.

A cross-section of the parts is shown in greater detail in Fig. 2. The joint consists of the existing body plate 1 wherein the damaged part has been cut out. The edge area has then been flanged for forming a sunk flange 3. The repair piece 2 has been fit to the flange in such a manner that the faces flush.

- 10 A suitable glue 4 which can adhere to steel plates has then been smeared onto the flanged piece 3 whereafter the repair piece 2 has been arranged in the hole.

- 15 To secure a good joint, i.e. with optimum strength and tightness, the two objects 1 and 2 must be pressed against each other for the curing time of the glue.

- 20 A typical curing time for a two-component glue is approx. 1 hour at 60°C and approx. 24 hours at 20°C. For this period the objects must as indicated be constantly held pressed together.

- For this purpose the retaining tool shown in Fig. 1 is used. In the shown example it comprises two suction discs 5 which are connected to a not shown vacuum source through pipes 6 so that the suction disc can adhere to the body plate 1 when the interior of the suction disc is evacuated.

- 30 A ball lock 7 is secured to the centre 27 of the suction disc (more clearly shown in Fig. 3) which ball 26 can be retained in a groove on a stay 8. The distance from plate 1 can thus be adjusted according to requirements.

- 35 At the end of the stay 8 there is a ball linkage 25 to a locking block 24. In this locking block 24 there is a through-going groove for the tubular bar 10, see particularly Fig. 3. Through the upper part of block 24 there is provided a through-going bolt 21 retaining a locking strap 9 intended to tip on this bolt.

- A pressure spring 22 arranged between the upper side of the locking block and the underside of the locking strap keeps locking strap 9 tipped down for contact with tubular bar 10 so that the block 24 is secured to tubular bar 10. By tipping the locking strap 9 on the bolt against the spring force by applying pressure on a tipping arm 23 mounted on the strap, block 24 can be released from the tubular bar and be displaced on the tubular bar for occupying any desired position. By releasing the pressure on tipping arm 23 the locking strap 9 is pressed down by the spring force to fit against bar 10 and block 24 is thus retained in the desired position on the bar. The tubular bar 10 can be extended at its ends by connecting bars 12 which via a linkage 11 allows an extension of the tool for pressing down joints of some length.

- When bar 10 has been secured, the intermediate piece 15 can be mounted on bar 10 at the desired place because of the used slide assemblies.

- 65 The intermediate piece 15 is telescopically

displaceable by means of a displaceable length of tubular bar 18, and a slot 16 and a through-going screw 17 provides the holding together in the desired length.

- 70 At one end 18 of the intermediate piece there is mounted a leg 19 provided with external thread in its entire length.

- This will partly allow displacement in a ball lock 7 of the above-mentioned type and partly adjustment by turning the leg in a nut. At the end of the leg there is a thrust pad 20 which via a ball joint provides plane contact against plate 2.

- 80 In order to press with the required strength there is at the opposite end of the intermediate piece 15 secured a second leg 13 which is likewise displaceable in a ball lock 7. At the foot there is mounted a rubber pad 14 acting counter to plate 1.

- 85 In this manner it is possible by turning leg 19 to press down pad 20 hard for ensuring the required pressure on the glue joint.

- In the shown example there is only shown one pressure leg 19 but in practice evenly distributed pressure legs will have to be mounted along the entire glue joint.

- The tool is so flexible that in all cases occurring in actual practice it will be possible to provide retaining pressure along the joint in that by a suitable choice of connecting pieces, intermediate pieces and joints it will always be possible to place thrust pads on the glue joint.

- Fig. 4 shows an example of an arrangement combining pressing down pressure with a lifting means in the form of a suction disc which can hold plate 1 in such a manner that the plate is prevented from becoming deformed by the pressure exerted by thrust pad 20. This is particularly necessary in cases of long joints for example when a motor-car door is provided with a new bottom part.

- The lifting suction disc is just like the other legs provided with a longitudinally adjustable connection to the intermediate piece, i.e. with thread and ball lock 26.

- As will appear from these examples it is possible by means of this equipment always to obtain the desired fixture at the same time while undesired deformations of the plates can be avoided by mounting suitable lifting means for compensating for the pressing down.

- The above examples only mention suction discs as retaining means but it is within the scope of the invention to use other suitable forms of adhesion such as electromagnetic and heat-meltable glue combined with an outer source of heat.

CLAIMS

- 125 1. Method for securing preferably sheet-like material to an underlying layer for example for the curing period of a glue joint between said material and the underlying layer, characterised in that a leg (19) is placed to contact the sheet-like material (2) and that the second leg

(13) is placed to contact the underlying layer (1) said legs (13, 19) being releasably secured to the underlying layer (1).

2. Method according to claim 1, characterised in that the legs (13, 19) are secured to an intermediate piece (15) in such a manner that the legs (13, 19) are longitudinally adjustable and that said intermediate piece (15) is connected with at least one retaining means (5) which may optionally be made to adhere to the underlying layer (1).

3. Means for carrying out the method according to claims 1 and 2, characterised in that the retaining means (5) comprises a suction disc the interior of which can be evacuated for adhesion to the underlying layer (1).

4. Means for carrying out the method according to claims 1 and 2, characterised in that the legs (13, 19) are provided with generally known necks for engagement with a ball (26) arranged in a locking sleeve (7) where said ball (26) may partly be retained in a groove and partly be released for displacement of the legs (13, 19).

5. Method for securing sheet-like material to an underlying layer, substantially as herein described with reference to the accompanying drawings.

6. Means for securing sheet-like material to an underlying layer, substantially as herein particularly described with reference to the accompanying drawings.